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CAREERS IN FORESTRY

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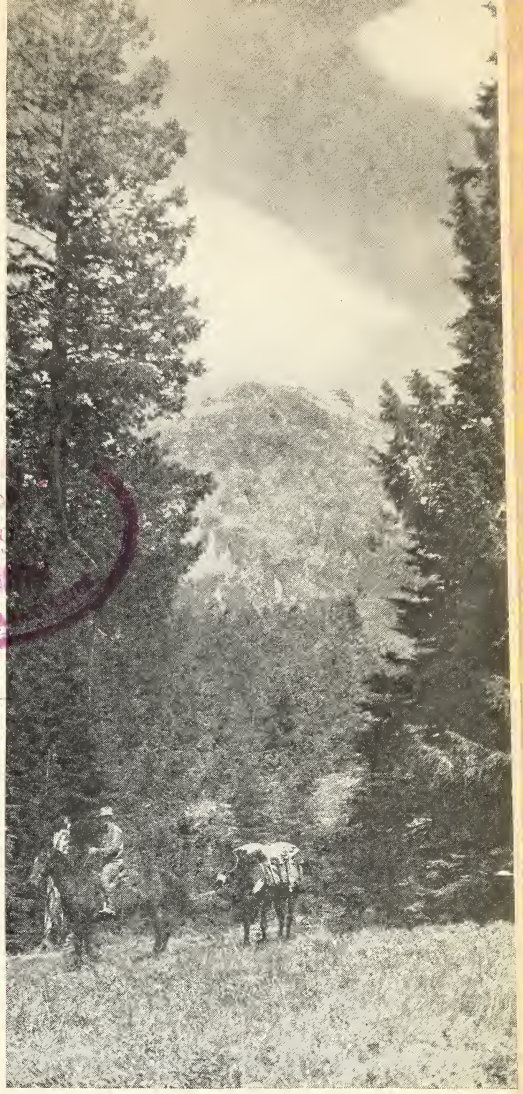

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DEPARTMENT OF AGRICULTURE
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Washington, D. C. January 1938

CAREERS IN FORESTRY [1]

Prepared by the Forest Service

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TRAINING FOR FORESTRY

During the last three decades forestry has made remarkable progress and has taken a position of great economic importance in the United States. Foresters are today charged with solution of one of our great economic problems, that of putting to the best use the 670 million acres of our lands most suitable for forest purposes. Complete and thorough training for the work is now fundamental to a career in the profession.

When active work began in forestry in this country, there were no forest schools on this side of the Atlantic. Prospective foresters had to go to Europe to obtain technical training. Anticipating the need for trained men, and in order to aid in the development of work in the field, several progressive institutions established schools of forestry even before any considerable demand for graduates was assured.

Private instruction in forestry was given at Biltmore, N. C., as early as 1897 by C. A. Schenck in connection with his work on the Vanderbilt estate. It was not until 1898, however, that an American educational institution gave definite recognition to the need for special training and instruction in the work by establishing a professional school of forestry. Cornell University led the way. In 1900 the Yale Forest School was started. Forest schools were established in the Universities of Michigan, Minnesota, and Nebraska in 1903, and in other universities and colleges in the years that followed.

[1] This publication is a revision of and supersedes Forestry as a Profession, an unnumbered publication issued in 1927.

Ideals and purposes of the new profession were necessarily in conflict with many long-established forest-utilization customs and practices and consequently encountered opposition. Gradually the misunderstandings were cleared up and the prejudices overcome. Forestry's field of usefulness in the United States has become more and more apparent with the passing of the years.

As early as 1912, it is estimated, there were approximately 500 men in the United States with a greater or less degree of technical training in forestry. These were in addition to forest rangers who began without a technical background, but who through their own experience in national and State work had acquired considerable practical knowledge of certain phases of the subject.

The importance of proper training now and in the future for a career in the field of forestry cannot be overestimated. As the number of foresters steadily increases and competition becomes more keen, thorough education will become more and more necessary.

The technical forester should have an education equivalent to that of the lawyer, doctor, civil engineer, or other well-trained professional man. Such an education usually requires a minimum of 4 years of college work. A course of 5 or 6 years—1 or 2 of which are spent in postgraduate work—is still better. The large number of men who look for employment in the lumber business or other forest-using industries will find college training in the principles of forestry as necessary to their success as to the success of men who plan to specialize in more scientific and technical work.

Courses leading to degrees in forestry are offered in about 25 institutions. Many other colleges also include forestry in their curricula, the instruction being given on a nonprofessional basis as supplementary training in other degree courses. Enrollment of undergraduates in forest schools in the United States for the 1936–37 school year totaled more than 6,000. There were more than 175 postgraduates. Figures from the forestry schools indicate about 500 degrees are being granted annually, and the number of professional foresters has reached a total of about 6,000.

College training is but a part of the preparation needed. It must be supplemented by first-hand experience in forest or conservation work. Many young men obtain part of this experience through summer-school camps and some get it through field work during summer vacation periods either in a Federal or State forest, or conservation organization, or in the employ of a lumber company. Men who plan to specialize in lumbering find several years of work in logging camps and in the mills valuable in learning the practical details of the business.

CHARACTER OF THE WORK

Many persons still have only a vague idea of the kind of life the forester really leads. Young men are often attracted to the profession because of the prospect of outdoor work. They are fond of camping in the open and of hunting and fishing.

One who is considering such a career should remember that the forester in his field work sometimes must endure hardships that sportsmen do not encounter. Spending considerable time in the woods as part of one's regular business is quite different from camping out for a few weeks on a vacation.

The apprenticeship period especially may be spent in such work as cruising or marking timber, making range surveys, reforestation of cut-over or abandoned farm lands, possibly in planting or conservation work in soil-erosion or flood-control areas. As the number of foresters increases and competition becomes more intense, the training period may be expected to lengthen.

The young forester is apt to have his headquarters shifted frequently from place to place, somewhat as is the case with the civil engineer. The places to which he is assigned may not always be the most desirable. Because of this shifting about, he may be unable for some time to establish a home. On the other hand, if he is an able man, he may ultimately advance to a position which will give him more permanent headquarters and greater opportunity for home life. He must not count himself secure, however, against a change of working field which will necessitate removal to a new place. Ordinarily, his home will be in a small town or in its vicinity.

Even in the higher positions, whether in Government or private work, the forester is likely to be obliged to spend a great deal of time in supervising or inspecting actual operations in the field. Trips away from his headquarters may be for only a day or so or may require several weeks. In some positions such travel often includes long, hard rides on horseback. Frequently it means hard and rough walking, and sometimes slow and laborious progress by snowshoe or canoe. Even with the greatest possible extension of good roads much of the forester's travel for many years to come will necessarily be rough. Doubtless the time will never come when it will all be easy.

The character of the work which foresters are called upon to do varies greatly. It may depend upon the aptitudes of the individual, his previous experience, and the degree and kind of specialized training.

Some men spend the greater part of their time in such work as determining the amount and rate of growth of the timber on given tracts, and working out the best methods of cutting to obtain a second crop without recourse to planting. Problems relating to forage on the ranges and the determination of grazing capacities and systems of range management that will improve and perpetuate this resource constitute another major field. Other men are occupied in dealing with wildlife and its management. Technical foresters work on all kinds of problems having to do with the life history and the productive capacity of the forest.

Groups of foresters are also engaged in devising methods of protecting the forest from fire, in organizing and operating efficient systems of administration, and in dealing with the problems of utilization of the forest and its products. Special aptitudes or interests may lead some men permanently into flood-control or soil-conservation work and others may find openings in connection with various forest, watershed, and land surveys, wildlife management, and in the extension of sound forestry practices in agriculture and industry.

Foresters, in the greater number, have to deal with both the scientific and business aspects of the profession. In brief, they must be good businessmen with thorough technical education. They must be able to manage and develop the property under their care in such a way as to make it yield high returns at low cost. Their scientific

equipment, as indicated, is a matter of thorough schooling; the business equipment must be gained through experience. Both are essential.

REQUISITES TO SUCCESS

After industry, honesty, and soundness of character, the most important personal requisites of the successful forester are a liking for the sort of life which he must lead and the health and constitution to stand it.

One who enjoys such a life will find a career in forestry fascinating; one who does not, may find the work monotonous and even positively disagreeable. It must not be understood, however, that the profession is a muscular one, pure and simple.

The successful forester must have, to a high degree, the qualities of foresight and broad-mindedness. These must be supplemented more and more, as the work becomes better organized, by a thoroughness in details. The man capable only of carrying out plans others have made will always, as in other professions, remain an assistant.

Administrative and executive ability are necessary for many positions. The forester's work is extremely practical and is concerned either directly or indirectly with the practical business administration of forest property. When he has advanced beyond an assistantship, he has charge of men and must have the ability to lead and direct.

In some forestry work in the strictly research field the forester may not have large administrative responsibilities, but the results of his research are essential to proper handling of the forests. All such investigational work may not seem entirely practical to the layman or administrative worker. The results, however, may develop thoroughly practical aspects. Modern conveniences and techniques owe their genesis in innumerable instances to the painstaking search of the scientists who labored to obtain the basic truths for which others found a practical application.

Many foresters must also have those qualities which make the successful teacher. In their efforts to stimulate and guide public thought in desirable channels they perform the functions of educators. Such work is a part of the regular duties in many positions. Nearly every forester, whether consciously or not, is helping to mold public sentiment. The work requires ability to meet people and gain the confidence of the public.

The spirit of service as indicated in our national-forest policy is a most important requisite to success in public forestry. It is the spirit that causes men to place the interests of society and of the group at large above the interests of self or of the few. It is embodied in the policy of so managing the forests as to promote the greatest good for the greatest number of our people.

Conservation of our natural resources is today one of the greatest internal problems of the Nation, and conservation with use is the essence of forestry. The forest is a resource for conservation; it is also an agency for conservation of other natural resources such as soil, water, wildlife, and forage. The work done in forest conservation in this country has been accomplished by men possessed of the spirit of service and believing wholeheartedly in what they have been doing.

The task of carrying this work forward will demand men capable of overcoming great obstacles.

THE FIELD OF WORK

Foresters are now employed with the Federal Government; with the States, most of which have forestry departments; with municipalities; with lumber companies and private owners of timberland; with wood-using industries; with educational institutions; and with organizations conducting research in forestry.

FORESTRY IN THE GOVERNMENT

Up to the close of the first decade of the century, the United States Government was the principal employer of American foresters. In 1912 it was officially estimated that 60 percent of the foresters in the country were in Government work and that fully 95 percent had been so engaged at one time or another. The situation was different in the 20-year period that followed. Outside demands grew so rapidly that only a minority of graduate foresters entered Government work. States, municipalities, educational institutions, and private corporations absorbed the majority of graduating foresters. However, the expansion of the Government's forestry activities in recent years has again made it the chief employer of trained foresters.

Although the larger number of the professional foresters now in Federal Government employ are in the United States Forest Service, a small group of foresters is employed in the management of forest lands on Indian reservations under the Office of Indian Affairs of the Department of the Interior. Foresters are also employed in the National Park Service of the same Department and in the Income Tax Unit of the Treasury, the Tennessee Valley Authority, and Civilian Conservation Corps, and in the Farm Security Administration, Soil Conservation Service, and Bureau of Biological Survey of the Department of Agriculture. Foresters with additional training in forest pathology and entomology are employed in the Bureau of Entomology and Plant Quarantine and the Bureau of Plant Industry of this Department.

CAREERS IN THE FOREST SERVICE

All permanent Forest Service positions are in the classified civil service. Examinations through which the force is largely recruited are those for junior foresters and junior range examiners. These are professional and highly technical. Graduation from a recognized college or university is required for entrance.

Men who pass the junior professional examinations are first assigned to positions as assistant district rangers or to subordinate lines of technical work. They may be assigned as technical assistants on the staff of the forest supervisor. The beginner in the service may thus supplement his academic training by actual work and experience that should qualify him for advancement to the position as district ranger or assistant supervisor.

In the early days of the Forest Service the forest ranger did not need much technical knowledge nor did he carry the responsibilities

that a district ranger now does. Such positions were often filled from the lists of those who passed the junior professional examinations. The situation has changed with the times.

The district forest ranger is today an administrator of a large area and a supervisor of all the activities within his district. The business he conducts is usually the largest of any in the community in which he lives. Both technical training and practical experience are required. Ranger jobs are now filled through promotions as are other key positions in the Service. The length of time a technically trained man may spend in subordinate positions before he becomes a district ranger will vary both with individual qualifications and with the opportunity. The average forest-school graduate should expect to spend at least 2 years in his first position.

One line of advancement may lead the young forester or range examiner from an assistant ranger position to the job as district ranger, then to an assignment as assistant forest supervisor, from which he may advance to a supervisor's position. Additional promotions may eventually take him to the regional forester's office or even higher.

Another line of progress may be from technical assistant on a forest ranger district to a position as technician on the supervisor's staff, followed by assignment as technician for an entire region or even higher. Occasionally other lines of promotion may be taken, but the technical training and preliminary experience are now considered as prerequisite to success in the higher brackets.

The career idea is thus carried out by advancement of men within the Service as they become more proficient in their work. Forest supervisors, assistant supervisors, and regional and national officers are men who have come up through the ranks.

Technical assistants to the ranger may be assigned to fire control, road and trail construction, timber culture, or other special jobs. Similarly, staff technicians directly under the forest supervisor may also be assigned to any one of these functions on the entire forest: Fire control, watershed protection, timber plans and sales, wildlife, range management, improvements of various kinds, timber culture, recreation, flood and erosion control, or to general technical work.

Experts for technical positions in a number of other lines of work in the Forest Service are recruited by special civil-service examinations. There are many of these jobs. Examples are: Lumbermen, land examiners, forest ecologists, engineers in timber tests, chemical engineers, and wood technologists. Clerks, stenographers, accountants, and similar office workers are likewise appointed from civil-service registers established through the regular examinations for such positions.

The force on the national forests comprises a number of grades. In general, the salary ranges of these grades are as follows: Technical assistant, $2,000 to $2,900; district forest ranger, $2,300 to $3,200; staff technician, $2,600 to $3,800; administrative assistant, $3,200 to $3,800; assistant forest supervisor, $3,200 to $3,800; forest supervisor, $3,200 to $3,800. When Government quarters are furnished, a salary deduction is made. The amount will vary with the value and kind of accommodations, but ordinarily is around $120 annually. Similarly, the ranges of salaries in higher administrative positions are in keeping with the responsibilities.

DIVISIONS IN THE FOREST SERVICE

Organization of the Federal Forest Service now includes 23 divisions. These are correlated into six groups. Some are fiscal and facilitating divisions in which the nature of the work calls for training entirely different from forestry, although forest-school graduates with special aptitudes or experience often find opportunities in these divisions. Men with professional forestry training are employed in the main in work that may be grouped under administration of national forests, research or technical investigations, State and private forest cooperation, and Civilian Conservation Corps activities. Certain other phases of Government forestry work, such as the Prairie States forestry project and various phases of extension, information, and education work, that are allied to or closely coordinated with the work of one or more of the divisions have also provided employment for a great many professional foresters.

ADMINISTRATION OF NATIONAL FORESTS

The national forests and purchase units cover a total net area of approximately 174 million acres. Almost 141 million acres of this land are in the public-land States west of the Mississippi River, chiefly in the mountains of the far West, more than 21 million acres are in Alaska, and approximately 12 million acres are in the Eastern States and Puerto Rico.

The protection, administration, and development of this vast area, on which the standing timber of merchantable size and species totals approximately 600 billion board feet, constitute the greatest task of the Forest Service and occupy the time and energies of most of its men. The management of these real forest properties distinguishes the work of the Forest Service from that of most Government bureaus. Its practical requirements have been met by a highly decentralized form of administration whereby the responsibility for handling local problems has been placed on the forest officers on the ground.

Administration of the national forests necessarily centers in the Washington office, to which are attached certain higher officers engaged in general direction and inspection of the work; but for promptness and convenience of field administration 10 national-forest regions have been established—9 in the States and 1 in Alaska. Each region is under the direct charge of a regional forester, who has associated with him such technical assistants as are necessary for the conduct of the work.

There are now almost 160 national forests, averaging more than a million acres each. A supervisor is in charge of each forest, and his staff may include an assistant supervisor and a number of technicians. The forests are also divided into districts, each in charge of a district ranger, who is responsible for the protection of this area and for the conduct of the business upon it. During the summer, guards are employed to supplement the regular force.

The system of national forests is being constantly enlarged through purchases of privately owned lands in 88 established purchase areas, of which 4 are in New England, 11 in the Appalachian region, 2 in the piedmont section of North Carolina and South Carolina, 20 in

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the southern pine region, 25 in the Ozark and central Mississippi States, 16 in the Lake and upper Mississippi regions, 9 in the Western States—Utah, Idaho, and California—and 1 in Puerto Rico. These purchases are made under provisions of the Weeks and Clarke-McNary laws.

The permanent force employed by the Forest Service numbers approximately 3,300. Of these, about two-thirds are employed upon the national forests as supervisors, assistant supervisors, rangers, etc., and the remainder are engaged in administrative, scientific, and clerical work at the Washington and regional headquarters, the Forest Products Laboratory, and the forest and range experiment stations. In addition, about 5,000 are employed temporarily on the national forests during the fire season each year.

The protection of the national forests from fire is of fundamental importance. Without adequate protection all other efforts directed toward increasing the productivity of the forests might be entirely nullified. Every effort has therefore been directed toward this objective.

The use of the forests by the public is constantly increasing and this has necessarily intensified the fire problem. In addition it has necessitated the handling of an immense amount of current business. The large volume of business involved in the disposal of forest and forage products and in the multiple use of land calls for constant and painstaking supervision. Indicative are the figures of the 1937 national forests receipts totaling more than $4,500,000. More than one-half of this amount came from timber sales, about $1,500,000 from the grazing of livestock, and more than $340,000 from special uses of the land, water power, and miscellaneous sources.

All the different lines of work on a national forest are handled by the regular administrative force under the immediate direction of the supervisor. Since the very beginning an effort has been made to apply the best forestry practice possible under existing conditions and the more technical phases of the work have accordingly been handled as far as practicable by the men with technical education—the junior foresters and range examiners. These men have had to perform such duties as mapping and estimating the timber on the forest, marking the trees to be removed in timber sales, raising stock at nurseries for field planting, reforesting treeless areas by planting, and looking after the varied phases of flood control and range management. The rangers also are called upon to do work of this character in addition to their regular protection and administrative duties.

The second step in the development of the forests has been the preparation of detailed plans for the administration and use of the resources of each forest. Such plans require sound technical training for their preparation and execution. Their perfection will be achieved only through the painstaking work of years, but already the results of better management clearly justify their application.

RESEARCH OR INVESTIGATIVE WORK

Forest research offers an opportunity equal to that of any other activity within the Forest Service for constructive work having a high public-service value. It deals almost altogether with new prob-

lems on which work in the United States is barely beginning. No other phase of forestry offers a more attractive career for men having the creative impulse.

Primary objectives of the research activities of the Forest Service are to obtain the scientific foundation for such management of forest lands as will help insure (1) supplies of timber and other essential forest crops suitable in quality and ample in quantity for national needs; (2) regulation of stream flow, prevention of erosion, furtherance of public health and outdoor recreation, increase in fish, game, and other wildlife, climatic and scenic benefits, etc.; (3) forage crops of the best kind in greatest quantity and the fullest utilization of these crops consistent with other objectives; (4) the fullest and most profitable use of forest land; (5) proper utilization of wood produced in the forest and the development of new and improved uses of wood.

The research includes five main classes. Research in forest management has to do with the growing of timber crops and with their management and protection; that in range management with producing and utilizing forage crops so far as may be consistent with the growing of timber; that in forest influences with the effects that forests, brush, and other natural cover have upon water, soil, and climate; that in forest products with reduction of waste and with effective utilization of wood and other forest products; that in forest economics with the facts and principles on which the policy of forest landowners should be based.

The research program is carried on at 12 regional forest and range experiment stations and at the Forest Products laboratory at Madison, Wis. The number of technical men engaged in the entire research program in forestry is 332. Additional temporary assistants are employed in some phases of the work in accordance with demands. The majority of these are forest-school students, but geologists, botanists, chemists, engineers, statisticians, and others are also used.

Technicians employed in research work are men with advanced training, most of whom have doctors' degrees or equivalent. The various phases of forest research require as the best foundation a broad training in forestry regardless of whether the investigator is to deal with management and protection, forest influences, grazing management, forest products, or economics. Advanced work—beyond this foundation training in forestry—may be in any one or more of a large group of biological or other sciences such as plant physiology, ecology, soils, genetics, taxonomy, and organic chemistry.

Wherever possible, men are encouraged to spend a limited time in the administrative organization either as forest rangers or as junior foresters in order to become familiar with actual forest practice before entering permanently upon research assignments. In employing men as temporary assistants, preference is given to forest-school students and others who are anxious to specialize later in research.

STATE AND PRIVATE FOREST COOPERATION

More than 450 million acres, or four-fifths of our total timber-growing area, is now in State or private ownership. More than 425 million acres, or practically 95 percent of this, is privately owned, with 185 million acres in farm woodlands. The area under State

or county ownership is increasing continuously through State acquisition for State forest purposes and through tax delinquency.

The future of forestry in the United States depends in no small degree upon acceptance and operation of better forest practices on these State and private lands. The problem of bringing about this improvement constitutes a challenge to the profession. Advancement in these phases of forestry has been the objective of several acts of Congress.

The Federal Government is working to bring about protection of State and private lands from fire through financial aid to the States under provisions of the Clarke-McNary law of 1924. States cooperating in fire protection in 1936 numbered 38, in addition to the Territory of Hawaii, and the total area of forest lands covered was aproximately 255 million acres. Estimates indicate that this is about 60 percent of the area in need of protection. The fire-protection projects are administered by the State forestry departments or comparable agencies, the Forest Service cooperating in development of plans, establishment of standards of procedure, and inspection of the work. Under the terms of the law, the Federal Government limits its expenditures in a given fiscal year to a sum not greater in each State than the funds expended jointly by the State and private owners, such private funds being expended directly through administrative channels of the State.

The Forest Service is also cooperating under the Clarke-McNary law with 40 States, in addition to Puerto Rico and Hawaii, in the production and distribution of young trees for planting windbreaks, shelterbelts, and farm woodlands. A total of approximately 36 million trees was distributed to farm owners in 1936. Under the Farm Forestry Act of May 18, 1937, an enlarged tree-planting and woodland-management and utilization program is contemplated.

Additional assistance is offered by the Government under the Clarke-McNary law in the form of aid to farm woodland owners in the management and care of their timber. In this project the Department of Agriculture is cooperating with 37 States and Puerto Rico. The work is focused particularly on the more efficient management of farm woodlands, the reforestation of those farm lands not now suitable for agricultural crops, and the marketing and utilization of farm timber.

The Fulmer law, approved by the President on August 29, 1935, authorizes cooperation with the several States for the purpose of stimulating the acquisition, development, and proper administration and management of State forests and of coordinating Federal and State activities in carrying out a national program of forest-land management. The act provides for purchase of certain forest lands for State forests through use of Federal funds and provides for a return of 50 percent of the proceeds from such lands to the Federal Government until the amount returned equals the cost of the land, at which time title to the land is turned over to the State. After 1942, States are required to have legislation providing for reversion of title to the State or a political unit thereof of tax-delinquent lands and for blocking into State or other public forests the areas which are more suitable for public than for private ownership. Under the act up to $5,000,000 was authorized for use in this way if and when appropriations are made.

FORESTRY AND THE CIVILIAN CONSERVATION CORPS

The work of the Forest Service was considerably expanded from 1933 to 1937 by the emergency relief and recovery activities.

Forest work for unemployed youth brought into the forests many thousands of men in the camps of the Civilian Conservation Corps. With these activities came a demand for thousands of foresters and men otherwise qualified for field-supervisory positions. Hundreds of young men just graduated from professional schools unexpectedly found opportunities awaiting them which offered an immediate chance to gain both a living and valuable forestry experience. Many student foresters were also taken on for temporary summer jobs which gave them the chance to earn needed money during their vacations and the opportunity to gain experience in forest work.

The Civilian Conservation Corps proved a great stimulus to the forestry profession. The social and economic value of forest work as an outlet for unemployed labor is now well recognized. This has broadened the field for the employment of foresters as directing and technical personnel.

PRAIRIE STATES FORESTRY PROJECT

In the fall of 1934 preliminary work was started by the Forest Service on a project for the establishment of shelterbelts in the Great Plains region. The so-called shelterbelt zone in which this work was carried on extends for more than 1,000 miles through the Dakotas, Nebraska, Kansas, Oklahoma, and into west Texas.

In general, the shelterbelt project contemplated the planting of millions of young trees, usually in shelterbelt strips several rods wide, so located as to afford protection to farmsteads and agricultural lands, and to improve farming and living conditions generally throughout the area. Government and State nurseries were established to provide planting stock where it could not be satisfactorily obtained from private nurseries. A staff of trained foresters was employed to direct the nursery and planting work on the project.

The Cooperative Farm Forestry Act of May 18, 1937, authorized a program of farm forestry and opened the way for continuation of tree planting in the prairie-plains area in the Prairie States forestry project. Direction and technical supervision for this work are supplied by the Forest Service.

FORESTRY IN THE STATES

Forestry work in the individual States has made notable progress in the past few years. There are now more than 40 States employing foresters in various capacities. The State forester in many of the States carries heavy responsibilities as directing head of a large organization and has under his control the annual disbursement of large appropriations.

The character of work which a State forester has to do depends upon the condition of development of forestry in his particular State. In a State where forestry is just beginning to receive attention his first efforts must be largely along educational and organizational lines. His chief task is to develop a forest policy for the State and to educate the people to protect and improve the handling of the

forests within its borders. He must study the needs of the State and then go before the people and show them what must be done to put into effect the policy which he has formulated. He usually has to make a great many public addresses, issue bulletins, write articles for the magazines and newspapers, and in every other possible way bring his message to the people. He must also obtain basic legislation and appropriations in addition to engaging in technical forest work.

On the other hand, in those States where there is already a settled forest policy the State forester's work is of a different character. His major activities are usually fire prevention and control, forest planting, educational work, management of State-owned forests, and forestry extension, which includes advice and assistance both to private owners of woodlands in the field and through correspondence.

Activity of the States with the cooperation and financial aid of the Federal Government in protecting forests from fire has opened a field of employment to many foresters. Trained men are also employed in the States in cooperative work with the Federal Government in the propagation and distribution of planting stock. Forestry-extension work is another field in which professional men find employment in the States in the capacity of extension foresters.

OPPORTUNITIES WITH CITIES

A new field of employment for trained foresters is opening up through the acquisition of city forests by municipalities. In addition to parks for recreational purposes and purchases of forested watersheds for the protection of sources of domestic water supplies, many cities are acquiring forest lands for investment and development purposes. The proper management of such properties naturally requires the services of trained foresters. In fact, a sound training in forestry seems indispensable in order to properly supervise city forests, municipal watersheds, and city parks, which usually present forest problems.

WORK IN PRIVATE FORESTRY

Though Federal and State employment and educational institutions and semipublic associations will doubtless continue to take the lead in research and extension, in the long run the great field for professional foresters will be in private work. Nearly three-fifths of the total stand of the merchantable timber in the 48 States and fully four-fifths of the good timber-producing land are in private ownership, and this fact alone clearly indicates a large and fruitful field of opportunity for the trained forester.

Private owners may be classified in a general way as lumber companies, including pulp and paper manufacturing companies, and other large manufacturers of wood products; public-service corporations, such as railroads and water companies; recreation and hunting clubs; mining companies; owners of large private estates; and farmers and other small woodland owners.

Private owners provided some of the earliest examples of professional forest management in the United States and a few owners have exercised care for years in handling their timberlands. Generally, however, they have been slow in adopting measures for con-

tinuous timber production. The Forest Service has recently set up as a permanent activity a project to work with the States, lumbermen's associations, and timberland owners to the end that improved woods practices will be extended. Private lumber interests are being aided in putting an appreciable area of private forest lands under sustained yield management and in eliminating the old devastating "cut-out and get-out" methods. It is possible that this movement may open up new opportunities for employment in private industrial forestry.

The forester who enters the lumber business must be prepared to estimate standing timber, appraise stumpage, determine the best method of cutting, estimate the future growth, lay out logging roads and railroads, reduce waste, increase utilization, and participate in actual lumbering and milling operations. Training for such work can be gained only by entering the lumber business at the bottom and learning its practical and administrative details in a long and exacting apprenticeship. Many foresters find opportunities in this type of work.

There is also a broad, yet undeveloped, field among public-service corporations owning timberlands. Many railroads own a certain amount of forest land, and the holdings of some are very extensive. Some of these corporations have already adopted a consistent and permanent policy of holding their timberlands and are introducing systematic forest protection. The next logical step would seem to be the inauguration of a system of forest administration somewhat similar to that on the national forests. Some of the eastern railroads have considered the acquisition of forest lands, with tree planting wherever necessary, for the production of ties and other wood supplies. Comparatively few of these public-service corporations employ foresters at the present time, however.

Though a knowledge of forestry is not essential to a retail or wholesale lumber dealer, a knowledge of woods and their properties gives the dealer an opportunity to speak with authority on the technical qualities of the woods and materials handled. The growing use of wood in all sorts of products, as in the manufacture of paper, plastic, and artificial silk, and the increasing use of such equipment as dry kilns and preserving plants to procure better utilization are creating opportunities for specialists in the industrial phases of wood utilization. This field, which is growing as wood becomes higher in price and as supplies become less plentiful, also offers opportunity for consulting work in the use of forest products, in saving waste, and in creating new uses for present-day little-used species, or in developing satisfactory substitutes for higher priced woods. However, the number of men engaged in work of this kind is small.

Many water companies hold extensive tracts of timberland on the drainage areas from which their water supplies are derived. These companies have for the most part adopted the definite policy of maintaining such land in forest growth. In many cases, they might find it to their advantage to employ professional foresters to keep the forest cover in the best possible condition while at the same time yielding a revenue.

Frequently mining companies own lands that are covered with tree growth. Many of the mining companies in the southern mountains,

especially coal-mining companies, own considerable areas of land which they wish to hold for mineral development, and also for the production of wood and timber for use in the mines. Some of these companies have already interested themselves in the question of treating timbers with chemical preservatives and others have taken up the problem of conservative management of the forest lands which they own.

Another class of private owners consists of those who have acquired forest property for hunting and other recreational purposes. Some of these owners are already beginning to practice forestry and to manage the game, and are employing foresters to take care of their property. Relatively few large tracts of land in private estates, however, are managed at present under forestry principles with a technical forester in charge. Most often the work on the ground is taken care of by a resident ranger or woods foreman. Where any technical work is done, it is directed or supervised by a consulting forester, who visits the tract only at intervals. Most of the forestry work so far done on private estates has been, and, except in the case of the largest owners, will probably continue to be of this character.

There are now a number of private firms and individuals who act as consulting foresters. Such work is the natural goal of many of the more mature and experienced men who have acquired a solid footing in the profession. Younger men are sometimes employed in this work as assistants and members of field parties.

The trend in the operation of private holdings seems likely to be more and more toward conservation practices. This development is likely to be accompanied by a growth in cooperative timber production and marketing among small landholders and farmers. Already some mills are being supplied with needed timber through such organizations. Trained foresters find a place in the cooperatives in directing the operations of the members and in managing the marketing of the timber they produce.

Artificial reforestation by private owners is also steadily assuming increased importance. Many of the States, in cooperation with the Federal Government under the provisions of the Clarke-McNary law, supply planting stock for farms and small woodlands at a nominal cost. Such cooperative activity cannot meet the demands of large timberland owners for reforestation on an extensive scale, however, and was not designed to do so. Meanwhile, interest in reforestation for timber-production purposes is steadily increasing, and accordingly there is a profitable field for professional foresters in collecting seed and raising nursery stock either as a business by itself or in connection with other forestry work.

The compensation in private forestry depends entirely upon the earning capacity of the individual. Ordinarily, foresters in private employ under salary are paid for their technical work at a somewhat higher rate than public forest officers in the same grade of work, higher salaries being necessary to make private work more attractive than public. Furthermore, where the forester works into a regular business, as, for example, in the lumber business, his remuneration will depend more upon his business capacity and what he can do for the company in a business way than upon his technical attainments. Some consulting foresters will be able to carry on a very prosperous

business, especially when they have established a national reputation which will cause a demand for their services in the solution of particularly important problems.

TEACHING AND RESEARCH

Teaching offers many opportunities to the technical forester Although the field is a rather limited one, nevertheless there are many calls for men with practical woods experience and ability as teachers. The teacher of forestry usually has the advantage of being able to carry on original studies in connection with his regular school work.

Closely associated with educational work is private research work. This field is an important one which offers attractive opportunities to suitably trained men. The profession and the economic needs of the Nation both urgently require that the research now being carried on at Government expense be supplemented with and checked by investigative work in educational institutions and endowed schools of science and by individuals of special attainment.

The Forest Service is far from having a monopoly of forest-research opportunities. The field is a wide-open one. Carefully conducted scientific investigations must lay the foundation for all practical woods work, and the men who make these investigations are really guiding the development of forestry. These studies must be not only along lines which have always been recognized as belonging to forestry, but also along such lines as forest entomology, pathology, meteorology, biology, and soils. Technical and practical training in forestry is of special value if not absolutely essential to success in investigations of this character.

The compensation received by men in research work in forestry is usually commensurate with that of other scientific work and sufficient to afford a comfortable living supplemented by the rewards of intellectual accomplishment and mental satisfaction.

LOOKING TO THE FUTURE

Forestry in the United States has received a great stimulus as an outgrowth of various Governmental activities in recent years. The demand for trained men has been such that practically all those available have been absorbed in various phases of the work. Interest in employment in the profession has been awakened and there are now indications that the number of men with professional training will increase rather than diminish. Developments in the field of forestry and in forest industries will largely determine future career possibilities in the profession.

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